

# HYPERNUMBERS AND OTHER EXOTIC STUFF



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Z-relation - [https://en.wikipedia.org/wiki/Interval\\_vector#Z-relation](https://en.wikipedia.org/wiki/Interval_vector#Z-relation)  
Accessibility relation - [https://en.wikipedia.org/wiki/Accessibility\\_relation](https://en.wikipedia.org/wiki/Accessibility_relation)  
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## (2) TROPICAL SECTION

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Tropical Geometry - [https://en.wikipedia.org/wiki/Tropical\\_geometry](https://en.wikipedia.org/wiki/Tropical_geometry)

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Log semiring - [https://en.wikipedia.org/wiki/Log\\_semiring](https://en.wikipedia.org/wiki/Log_semiring) && Log SumExp - <https://en.wikipedia.org/wiki/LogSumExp>

Tight spans, Isbell completions and semi-tropical modules - Simon Willerton

<https://arxiv.org/pdf/1302.4370.pdf> (one half of the tropical semiring)

Hyperfields for Tropical Geometry I. Hyperfields and dequantization - Oleg Viro

<https://arxiv.org/pdf/1006.3034.pdf> (see section "6. Tropical addition of complex numbers")

Supertropical quadratic forms II: Tropical trigonometry and applications - Zur Izhakian, Manfred Knebusch and Louis Rowen

[https://www.researchgate.net/publication/326630264\\_Supertropical\\_Quadratic\\_forms\\_II\\_Tropical\\_Trigonometry\\_and\\_Applications](https://www.researchgate.net/publication/326630264_Supertropical_Quadratic_forms_II_Tropical_Trigonometry_and_Applications)

Tropical geometry to analyse demand - Elizabeth Baldwin and Paul Klemperer

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<https://scholarsarchive.byu.edu/cgi/viewcontent.cgi?article=2504&context=etd>

## (3) NUMERALS ON THE NUMERIC

Lunar Arithmetic or Dismal Arithmetics - David Applegate, Marc LeBrun and N. J. A. Sloane

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Balanced Ternary - [https://en.wikipedia.org/wiki/Balanced\\_ternary](https://en.wikipedia.org/wiki/Balanced_ternary)

[https://pt.wikipedia.org/wiki/Tern%C3%A1rio\\_balanceado#/media/Ficheiro:Balanced\\_ternary.svg](https://pt.wikipedia.org/wiki/Tern%C3%A1rio_balanceado#/media/Ficheiro:Balanced_ternary.svg)

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Skew binary number system - [https://en.wikipedia.org/wiki/Skew\\_binary\\_number\\_system](https://en.wikipedia.org/wiki/Skew_binary_number_system)

Two Skew-Binary Numeral Systems and One Application - Amr Elmasry and Jyrki Katajainen

<http://cphstl.dk/Paper/TOCS-2011/journal.pdf>

Zero Displacement Ternary Number System : the most economical way of representing numbers

Fernando Guilherme and Silvano Lobo Pimentel

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[258241283 Zero Displacement Ternary Number System the most economical way of representing numbers](https://www.researchgate.net/publication/258241283_Zero_Displacement_Ternary_Number_System_the_most_economical_way_of_representing_numbers)

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Beyond the Complexes: Toward a lattice based number system - J. Köpflinger, J. A. Shuster  
<https://www.cs.du.edu/~petr/milehigh/2013/Koeplinger.pdf>

Linear Numeral System - Ian Mackie - <http://www.ianmackie.com/papers/linns.pdf>

New approach could sink floating point computation, John Leroy Gustafson  
<https://www.nextplatform.com/2019/07/08/new-approach-could-sink-floating-point-computation/>  
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Unum - [https://en.wikipedia.org/wiki/Unum\\_\(number\\_format\)](https://en.wikipedia.org/wiki/Unum_(number_format))

"Strength in Numbers: Unums and the Quest for Reliable Arithmetic" by Ferris Ellis - [https://www.youtube.com/watch?v=nVNYjmj\\_qbY](https://www.youtube.com/watch?v=nVNYjmj_qbY)

The residue logarithmic number system: Theory and implementation - Mark G. Arnold  
[https://www.researchgate.net/publication/4156476\\_The\\_residue\\_logarithmic\\_number\\_system\\_Theory\\_and\\_implementation](https://www.researchgate.net/publication/4156476_The_residue_logarithmic_number_system_Theory_and_implementation)

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Hetero Base Arithmetic - Raghavendra Lingayya  
<https://web.archive.org/web/20210213220933/http://www.numbersystem.org/hetero-base-arithmetic-operations.html>  
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A Number System with Continuous Valued Digits and Modulo Arithmetic - Aryan Saèd, Majid Ahmadi and Graham A. Jullien -  
[https://www.academia.edu/13000520/A\\_number\\_system\\_with\\_continuous\\_valued\\_digits\\_and\\_modulo\\_arithmetic](https://www.academia.edu/13000520/A_number_system_with_continuous_valued_digits_and_modulo_arithmetic)

Hereditary Base notation - [https://en.wikipedia.org/wiki/Goodstein%27s\\_theorem#Hereditary\\_base-n\\_notation](https://en.wikipedia.org/wiki/Goodstein%27s_theorem#Hereditary_base-n_notation)

New Arithmetic Algorithms for Hereditarily Binary natural numbers - Paul Tarau  
<https://www.cse.unt.edu/~tarau/research/2014/HBinX.pdf>

Predicting Improper Fractional Base Integer Characteristics - Billy Dorminy - <http://educ.jmu.edu/~lucassk/Papers/DorminyFracBase.pdf>

Horus Eye Fractions - [https://en.wikipedia.org/wiki/Eye\\_of\\_Horus#Mathematics](https://en.wikipedia.org/wiki/Eye_of_Horus#Mathematics)  
Egyptian geometry - [https://en.wikipedia.org/wiki/Egyptian\\_geometry](https://en.wikipedia.org/wiki/Egyptian_geometry)  
Ancient Egyptian units of measurement - [https://en.wikipedia.org/wiki/Ancient\\_Egyptian\\_units\\_of\\_measurement](https://en.wikipedia.org/wiki/Ancient_Egyptian_units_of_measurement)  
Red auxiliary number - [https://en.wikipedia.org/wiki/Red\\_auxiliary\\_number](https://en.wikipedia.org/wiki/Red_auxiliary_number)

Finger Binary - [https://en.wikipedia.org/wiki/Finger\\_binary](https://en.wikipedia.org/wiki/Finger_binary)

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A History of Mathematical Notations (Dover Books on Mathematics)  
<https://www.amazon.com/History-Mathematical-Notations-Dover-Mathematics/dp/0486677664>  
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<https://www.amazon.com/Words-Mathematics-Etymological-Dictionary-Mathematical/dp/0883855119>

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The Denormal Logarithmic Number System - Mark G. Arnold Sylvain Collange  
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The generalized golden proportions, a new theory of real numbers, and ternary mirror-symmetrical arithmetic - Alexey Stakhov  
<http://fs.unm.edu/SN/TheGeneralizedGolden.pdf>

Construction of Algorithms for Parallel Addition - Jan Legersky and Milena Svobodová  
[https://jan.legersky.cz/talks/ConstructionParAddAlg\\_WorkshopOnAutomaticSequences.pdf](https://jan.legersky.cz/talks/ConstructionParAddAlg_WorkshopOnAutomaticSequences.pdf)  
On-line algorithms for multiplication and division in real and complex numeration systems – Marta Brzicová, Christiane Frougny, Edita Pelantová and Milena Svobodová - <https://arxiv.org/abs/1610.08309v5>

Computing with Exact Real Numbers in a Radix-r System - Alexander Kaganovsky  
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A variant of Ostrowski numeration - Emmanuel Cabanillas - <https://arxiv.org/pdf/1904.01874v2.pdf>

LCM number system - [https://oeis.org/wiki/LCM\\_numeral\\_system](https://oeis.org/wiki/LCM_numeral_system) && Primorial - [https://oeis.org/wiki/Primorial\\_numeral\\_system](https://oeis.org/wiki/Primorial_numeral_system)  
Factorial number system - [https://oeis.org/wiki/Factorial\\_numeral\\_system](https://oeis.org/wiki/Factorial_numeral_system) && [https://en.wikipedia.org/wiki/Factorial\\_number\\_system](https://en.wikipedia.org/wiki/Factorial_number_system)  
Combinadic - <http://www.thefullwiki.org/Combinadic>

Society's "Ring of Truth" - John A. Shuster - [https://www.researchgate.net/publication/363053086\\_Society's\\_Ring\\_of\\_Truth](https://www.researchgate.net/publication/363053086_Society's_Ring_of_Truth)

Typographical Number Theory - [https://en.wikipedia.org/wiki/Typographical\\_Number\\_Theory](https://en.wikipedia.org/wiki/Typographical_Number_Theory)

Gödel numbering - [https://en.wikipedia.org/wiki/G%C3%B6del\\_numbering](https://en.wikipedia.org/wiki/G%C3%B6del_numbering)

Octomatics number system - <http://octomatics.org/>

Sandpiles - Luis David Garcia-Puente - <http://people.reed.edu/~davidp/> && <https://www.youtube.com/watch?v=1MtEUErz7Gg>

Location arithmetic - [https://en.wikipedia.org/wiki/Location\\_arithmetic](https://en.wikipedia.org/wiki/Location_arithmetic)  
Yupana - <https://en.wikipedia.org/wiki/Yupana> && Yupana Inka en Matergia! - <https://www.youtube.com/watch?v=gTBEqIkhGSQ>  
Japan's ancient secret to better cognitive memory (soroban) - BBC REEL - <https://www.youtube.com/watch?v=s6OmQXCsYt8>

...some can be found in the following wikipedia links :  
[https://en.wikipedia.org/wiki/List\\_of\\_numeral\\_systems#By\\_culture\\_/time\\_period](https://en.wikipedia.org/wiki/List_of_numeral_systems#By_culture_/time_period)  
[https://en.wikipedia.org/wiki/Category:Non-standard\\_positional\\_numeral\\_systems](https://en.wikipedia.org/wiki/Category:Non-standard_positional_numeral_systems)  
[https://en.wikipedia.org/wiki/Non-standard\\_positional\\_numeral\\_systems](https://en.wikipedia.org/wiki/Non-standard_positional_numeral_systems)

#### **(4) NUMERALS BEYOND NUMERIC**

Facial Action Coding System - Carl-Herman Hjortsjö, Paul Ekman and Wallace V. Friesen  
[https://en.wikipedia.org/wiki/Facial\\_Action\\_Coding\\_System#Codes\\_for\\_action\\_units](https://en.wikipedia.org/wiki/Facial_Action_Coding_System#Codes_for_action_units)

Notación de apreciación de intensidad emocional y partitura emocional - Susana Bloch  
<https://www.casadellibro.com/ebook-surfeando-la-ola-emocional-ebook/9789568601287/2108202>  
Respiratory patterns - [http://onlinepdfcatalog.com/images/pdf/albaemoting.cl1-2\\_1.jpg](http://onlinepdfcatalog.com/images/pdf/albaemoting.cl1-2_1.jpg)  
Alba Emoting - [https://en.wikipedia.org/wiki/Susana\\_Bloch#Alba\\_Emoting](https://en.wikipedia.org/wiki/Susana_Bloch#Alba_Emoting)

Plutchik's Wheel of emotions - [https://en.wikipedia.org/wiki/Emotion\\_classification#Plutchik's\\_wheel\\_of\\_emotions](https://en.wikipedia.org/wiki/Emotion_classification#Plutchik's_wheel_of_emotions)  
Interactive wheel - <https://www.6seconds.org/2022/03/13/plutchik-wheel-emotions/>

Heartmath - Doc Lew Childre Jr. - <https://www.heartmath.com/science/>

Emojitocode (code learning with emojis) - <https://www.emojicode.org/> && Emojipedia - <https://emojipedia.org/>

Laban notation - <https://en.wikipedia.org/wiki/Labanotation>  
Knust's Dictionary of Kinetography Laban - <https://knustdict.netlify.app/entries>

Geometrography - <https://en.wikipedia.org/wiki/Geometrography>

A Compiler for 3D Machine Knitting - <https://la.disneyresearch.com/wp-content/uploads/A-Compiler-for-3D-Machine-Knitting-Paper.pdf>

Algoritmo del cortejo humano, heterosociabilidad y diálogo venusiano



MAX-VA-CUA-RO Secuenciado - Equipo de Seducción Científica - <https://dinamicassociales.com/>  
Las 3 C's y macrohabilidades del  $\Delta$  Helio - Equipo de Psicología Heterosocial - <https://www.egolandseducacion.com/>

Genealogical numbering systems - [https://en.wikipedia.org/wiki/Genealogical\\_numbering\\_systems](https://en.wikipedia.org/wiki/Genealogical_numbering_systems)  
Symbols and diagrams of the Family Tree - <https://en.wikipedia.org/wiki/Genogram#Symbols>  
Six basic patterns of kinship - [https://en.wikipedia.org/wiki/Kinship\\_terminology#Six\\_basic\\_patterns\\_of\\_kinship](https://en.wikipedia.org/wiki/Kinship_terminology#Six_basic_patterns_of_kinship)  
WikiTree (a wiki for genealogists) - <https://www.wikitree.com/>

Reading fluids circuit diagrams : hydraulic & pneumatic symbols  
<https://www.valmet.com/media/articles/up-and-running/reliability/FRFluidDwgs1/>  
Electrical, pneumatic and logic symbols  
<https://www.festo-didactic.com/ov3/media/customers/1100/00525179001075223667.pdf>  
A Primer on Basic on Basic Hydraulic and Pneumatic Symbols  
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Crash Course in Quantum Computing Using Very Colorful Diagrams - Rishabh Anand  
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Demystifying Quantum Gates One Qubit At A Time - Jason Roell  
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Feynman diagram - [https://en.wikipedia.org/wiki/Feynman\\_diagram](https://en.wikipedia.org/wiki/Feynman_diagram)

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Xenharmonic ( a wiki about musical tuning ) - <https://en.xen.wiki/>

Universal Script - Matthew DeBlock - <http://www.dsript.org/> (Uscript is universal logographic language based on math and physics)  
Kēlen Ceremonial Interlace Alphabet - <https://www.terjemar.net/kelen/lajathin.php>  
Nato phonetic alphabet - [https://en.wikipedia.org/wiki/NATO\\_phonetic\\_alphabet](https://en.wikipedia.org/wiki/NATO_phonetic_alphabet) Q-code [https://en.wikipedia.org/wiki/Q\\_code](https://en.wikipedia.org/wiki/Q_code)

Cookbook:Units of measurement - [https://en.wikibooks.org/wiki/Cookbook:Units\\_of\\_measurement](https://en.wikibooks.org/wiki/Cookbook:Units_of_measurement)  
Mateschef: Un sofrito de números y formas para chefs y gourmets - Claudi Alsina  
<https://www.amazon.com/Mateschef-sofrito-n%C3%BAmoros-formas-gourmets/dp/8434422719>

QUANTUM-LANGUAGE-PARSE-SYNTAX-GRAMMAR ( <https://dwmlc.com/> )  
( an exotic grammar obtained after squashing an assembly programmer against a judge )  
[https://en.wikipedia.org/wiki/David\\_Wynn\\_Miller#Constructed\\_language\\_and\\_linguistic\\_theories](https://en.wikipedia.org/wiki/David_Wynn_Miller#Constructed_language_and_linguistic_theories)  
<https://github.com/lismore/MathematicalInterfaceForLanguage/blob/master/README.md>  
: Russell-Jay: Gould. - <https://www.youtube.com/channel/UC2FPVSe66WpLdfoiQem4FzA/videos>  
:QUANTUM-GRAMMAR-CHANNEL: - <https://www.youtube.com/c/QUANTUMGRAMMARCHANNEL/videos>

Neuro-optometry - Deborah G Zelinsky - <https://mindeye.com/research/>  
Pen and paper excises - Donalee Markus - <https://www.designsforstrongminds.com/paper-exercises>  
Conference for the American Optometric Association - Clark Elliott - <https://www.youtube.com/watch?v=LXCoQsLYWw>  
Parents with Autism: Neuroplasticity in Action - <https://www.youtube.com/watch?v=Ak7A6cMrrQM>

Lin4Neuro (neuroimaging) - [https://www.nemotos.net/?page\\_id=29](https://www.nemotos.net/?page_id=29)  
The End of Mental Illness: How Neuroscience Is Transforming Psychiatry - Daniel G. Amen  
<https://www.amazon.com/End-Mental-Illness-Neuroscience-Transforming/dp/1496438159>  
The most important lesson from 83,000 brain scans - <https://www.youtube.com/watch?v=esPRsT-lmw8>

Aproximate number system - [https://en.wikipedia.org/wiki/Approximate\\_number\\_system](https://en.wikipedia.org/wiki/Approximate_number_system)  
Numerical cognition - [https://en.wikipedia.org/wiki/Numerical\\_cognition](https://en.wikipedia.org/wiki/Numerical_cognition)  
Number sense in animals - [https://en.wikipedia.org/wiki/Number\\_sense\\_in\\_animals](https://en.wikipedia.org/wiki/Number_sense_in_animals)  
Together with dyscalculia, ageometresia, dysgraphia, financial illiteracy  
Innumeracy - [https://en.wikipedia.org/wiki/Innumeracy\\_%28book%29](https://en.wikipedia.org/wiki/Innumeracy_%28book%29)  
Hypernumeracy - <https://www.andnextcomesl.com/2019/10/hypernumeracy.html>

WikiOdour (a wiki about odor metric) - Scentroid - <https://scentroid.com/wikiodour/>  
NASA's Chief Sniffer - [https://www.youtube.com/watch?v=oRdgmN\\_Yq3U](https://www.youtube.com/watch?v=oRdgmN_Yq3U)

The perfume maker in Dubai Gold Souq who can create any fragrance - <https://www.youtube.com/watch?v=5WYu0FxyPw>

## (5) TRIANGLE ZONE

A treatise on the analytical geometry of the point, line, circle, and conic sections, containing an account of its most recent extensions, with numerous examples - John Casey - <https://archive.org/details/cu31924001520455>  
Modern triangle geometry - [https://en.wikipedia.org/wiki/Modern\\_triangle\\_geometry](https://en.wikipedia.org/wiki/Modern_triangle_geometry)

Trilinear Coordinates - <https://mathworld.wolfram.com/TrilinearCoordinates.html>  
[https://en.wikipedia.org/wiki/Incenter#Trilinear\\_coordinates](https://en.wikipedia.org/wiki/Incenter#Trilinear_coordinates)

Transformation of trilinear and quadriplanar to and from cartesian coordinates - John B Mertie  
[http://www.minsocam.org/ammin/AM49/AM49\\_926.pdf](http://www.minsocam.org/ammin/AM49/AM49_926.pdf)

Special Isocubics in the Triangle Plane - Jean-Pierre Ehrmann and Bernard Gibert  
<https://bernard-gibert.pagesperso-orange.fr/files/Resourc/SITP.pdf>

The Encyclopedia of Triangle Centers - <https://faculty.evansville.edu/ck6/encyclopedia/ETC.html>

Bicentric Pairs of Points and Related Triangle Centers - Clark Kimberling - <https://forumgeom.fau.edu/FG2003volume3/FG200303.pdf>

Barycentric Coordinates - <https://mathworld.wolfram.com/BarycentricCoordinates.html>

Green Coordinates - Yaron Lipman, David Levin and Daniel Cohen-Or [https://www.wisdom.weizmann.ac.il/~ylyipman/GC/gc\\_techrep.pdf](https://www.wisdom.weizmann.ac.il/~ylyipman/GC/gc_techrep.pdf)

Harmonic Coordinates - Tony DeRose and Mark Meyer - <https://graphics.pixar.com/library/HarmonicCoordinates/paper.pdf>

The barycentric conspiracy - Fabian "ryg" Giesen - <https://fgiesen.wordpress.com/2013/02/06/the-barycentric-conspirac/>

Areal Coordinates - <https://mathworld.wolfram.com/ArealCoordinates.html>

Approach on area coordinate, volume coordinate and their usage in true 3dgis - Gang Liao, Qingyuan Li, Xu Chen and Jiarong Zheng  
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Areal Co-ordinate Methods in Euclidean Geometry - Tom Lovering - <https://bmos.ukmt.org.uk/home/areals.pdf>

Synergetics Coordinates - <https://mathworld.wolfram.com/SynergeticsCoordinates.html> (Clifford J. Nelson 's Wolfram Notebooks)

Buckminster Fuller Notebooks - <https://library.wolfram.com/infocenter/MathSource/600/>

Bucky Number Mandelbrot - <https://library.wolfram.com/infocenter/MathSource/428/>

Four Triangle Fractals using Bucky Numbers and Synergetics Coordinates - <https://library.wolfram.com/infocenter/MathSource/754/>

Quadrangle coordinates - [https://en.wikipedia.org/wiki/Quadrangle\\_coordinates](https://en.wikipedia.org/wiki/Quadrangle_coordinates)

Polysign Numbers - Tim Golden - <http://www.bandtechnology.com/PolySigned/index.html>

Pacman Product for Polysigned numbers - Tanaka - <https://archive.org/details/polysignedpacmanproduct>

On intertwined polysigned p3 and equatorial geometry - Tanaka - [https://archive.org/details/intertwined\\_polysigned\\_p3\\_on\\_the\\_equator](https://archive.org/details/intertwined_polysigned_p3_on_the_equator)

Notas Sobre Polisignos Y Objetos Terciarios - Kujonai - <https://vixra.org/pdf/2002.0570v1.pdf>

Understanding Polysign Numbers the Standard Way - Hagen von Eitzen - <http://www.von-eitzen.de/math/PolysignNumbers.pdf>

Lua Digital: Matemática (Portuguese Edition) Roberto Siqueira Costa

<https://www.amazon.com/Lua-Digital-Roberto-Siqueira-Costa-ebook/dp/B0118HD4V0>

Chromatic Numbers and Ternary Algebra - Kavosh Havaledarnejad

[https://www.academia.edu/25274352/Chromatic\\_Numbers\\_and\\_Ternary\\_Algebra](https://www.academia.edu/25274352/Chromatic_Numbers_and_Ternary_Algebra)

An Euler phi function for the Eisenstein integers and some applications - Emily Gullerud, Aba Mbirika - <https://arxiv.org/abs/1902.03483>

Tropical projective space - [https://en.wikipedia.org/wiki/Tropical\\_projective\\_space](https://en.wikipedia.org/wiki/Tropical_projective_space)

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On anharmonic co-ordinates - William Rowan Hamilton - <https://www.emis.de/classics/Hamilton/Anharm.pdf>

Anharmonic coordinates - Henry William Lovett Hime - <https://archive.org/details/anharmoniccoordi00himerich>

Triangular root - [https://en.wikipedia.org/wiki/Triangular\\_number#Triangular\\_roots\\_and\\_tests\\_for\\_triangular\\_numbers](https://en.wikipedia.org/wiki/Triangular_number#Triangular_roots_and_tests_for_triangular_numbers)

Hedronometry (Dimensionally enhanced Trigonometry) - Blue the hedronometer - <http://daylateanddollarshort.com/mathdocs/>

Trigonometry of a tetrahedron - [https://en.wikipedia.org/wiki/Trigonometry\\_of\\_a\\_tetrahedron](https://en.wikipedia.org/wiki/Trigonometry_of_a_tetrahedron)

Three dimensional geometry, ZOME, and the elusive tetrahedron

[https://www.maths.unsw.edu.au/sites/default/files/3dgeom\\_zome\\_tetrahedron\\_seminar.pdf](https://www.maths.unsw.edu.au/sites/default/files/3dgeom_zome_tetrahedron_seminar.pdf)

La géométrie des tétraèdres - Philippe Tilleuil

A New and Very Long Proof of the Pythagoras Theorem - Kaushik Basu - <http://kaushikbasu.org/Pythagoras%206.pdf>

Ternary arithmetic, factorization, and the class number one problem - Aram Bingham - <https://arxiv.org/pdf/2002.02059v2.pdf>

Parallelogon - <https://en.wikipedia.org/wiki/Parallelogon>

Trigonal trapezohedral honeycomb - [https://en.wikipedia.org/wiki/Trigonal\\_trapezohedral\\_honeycomb](https://en.wikipedia.org/wiki/Trigonal_trapezohedral_honeycomb)

Rhombic dodecahedral honeycomb - [https://en.wikipedia.org/wiki/Rhombic\\_dodecahedral\\_honeycomb](https://en.wikipedia.org/wiki/Rhombic_dodecahedral_honeycomb)

Maxicode - <https://en.wikipedia.org/wiki/MaxiCode>

Solid Geometry with Problems and Applications - H. E. Slaught and N. J. Lennes - <https://www.gutenberg.org/files/29807/29807-pdf.pdf>  
Polyhedral angle - [https://encyclopediaofmath.org/wiki/Polyhedral\\_angle](https://encyclopediaofmath.org/wiki/Polyhedral_angle)

Cubic Pythagoras – Luis Teia (pythagoras with cubes instead of squares)  
<https://wonderfulengineering.com/pythagoras-theorem-has-been-upgraded-to-3d-and-now-requires-a-120-page-proof/>  
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<https://web.archive.org/web/20170922045632/http://www.ccsenet.org/journal/index.php/jmr/article/viewFile/64646/34833>  
Fermat's Theorem – a Geometrical View  
[https://www.researchgate.net/profile/Luis-Teia/publication/312607399\\_Fermat's\\_Theorem\\_-\\_a\\_Geometrical\\_View/links/58863f6d92851c21ff4d5825/Fermats-Theorem-a-Geometrical-View.pdf](https://www.researchgate.net/profile/Luis-Teia/publication/312607399_Fermat's_Theorem_-_a_Geometrical_View/links/58863f6d92851c21ff4d5825/Fermats-Theorem-a-Geometrical-View.pdf)

Heavenly Mathematics The Forgotten Art of Spherical Trigonometry - Glen Van Brummelen  
<https://www.amazon.com/Heavenly-Mathematics-Forgotten-Spherical-Trigonometry/dp/0691175993>

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Pythagoras theorem variation - Claudi Alsina - <http://claudialsina.com/wp-content/uploads/2016/10/newpythlikethms.pdf>  
Extended Pythagoras Theorem Using Hexagons - Luis Teia  
[https://www.researchgate.net/publication/356441337\\_Extended\\_Pythagoras\\_Theorem\\_Using\\_Hexagons](https://www.researchgate.net/publication/356441337_Extended_Pythagoras_Theorem_Using_Hexagons)  
Extended Pythagoras Theorem using Triangles, and its Applications to Engineering - Luis Teia  
[https://www.researchgate.net/publication/357896374\\_Extended\\_Pythagoras\\_Theorem\\_using\\_Triangles\\_and\\_its\\_Applications\\_to\\_Engineering](https://www.researchgate.net/publication/357896374_Extended_Pythagoras_Theorem_using_Triangles_and_its_Applications_to_Engineering)

Duocode, a parallel of the unicode standard for hexagonal typesetting - Alexander Egorov

Hex Grid Geometry for Game Developers - Herman Tulleken - <http://gamelogic.co.za/downloads/HexMath2.pdf>

Polynumbers, Norms, Metrics, and Polyangles - R R Aidagulov and M V Shamolin  
[https://www.researchgate.net/publication/270597014\\_Polynumbers\\_Norms\\_Metrics\\_and\\_Polyangles](https://www.researchgate.net/publication/270597014_Polynumbers_Norms_Metrics_and_Polyangles)  
Finsler Spaces, Bingles, Polyangles, and Their Symmetry Groups - R. R. Aidagulov and Maxim V. Shamolin  
[https://www.researchgate.net/publication/270597384\\_Finsler\\_Spaces\\_Bingles\\_Polyangles\\_and\\_Their\\_Symmetry\\_Groups](https://www.researchgate.net/publication/270597384_Finsler_Spaces_Bingles_Polyangles_and_Their_Symmetry_Groups)

Taxicab Angles and Trigonometry - Kevin Thompson and Tevian Dray - <https://arxiv.org/pdf/1101.2917.pdf>

Divine Proportions: Rational Trigonometry to Universal Geometry - Norman J. Wildberger  
<https://www.amazon.com/Divine-Proportions-Rational-Trigonometry-Universal/dp/097574920X>  
Wildberger 's channel - <https://www.youtube.com/user/njwildberger>  
Rational trigonometry - [https://handwiki.org/wiki/Rational\\_trigonometry](https://handwiki.org/wiki/Rational_trigonometry)

Pascal simplex - [https://en.wikipedia.org/wiki/Pascal's\\_simplex](https://en.wikipedia.org/wiki/Pascal's_simplex)

Using Chinese Dumbass Notation to Find Algebraic Identities Daniel - Liu Daniel Liu  
[https://www.academia.edu/11576181/Using\\_Chinese\\_Dumbass\\_Notation\\_to\\_Find\\_Algebraic\\_Identities](https://www.academia.edu/11576181/Using_Chinese_Dumbass_Notation_to_Find_Algebraic_Identities)

Introduction to the General Trigonometry in Euclidian 2D-space - Claude Ziad Bayeh  
<http://www.wseas.us/e-library/transactions/mathematics/2012/53-882.pdf>

Plimpton 322 is Babylonian exact sexagesimal trigonometry - Daniel Francis Mansfield and Norman Wildberger  
[https://www.researchgate.net/publication/319286288\\_Plimpton\\_322\\_is\\_Babylonian\\_exact\\_sexagesimal\\_trigonometry](https://www.researchgate.net/publication/319286288_Plimpton_322_is_Babylonian_exact_sexagesimal_trigonometry)  
Old Babylonian mathematics and Plimpton 322: A new understanding of the OB tablet Plimpton 322  
<https://www.youtube.com/watch?v=L24GzTaOll0>

## (6) SOFTWARE ZONE

### DATA STRUCTURES\*

Treesheet (tree-like spreadsheet) - <http://strlen.com/treesheets/>  
Blockchain (demo) - <https://andersbrownworth.com/blockchain/>  
Heimer (mind map) - <https://github.com/juzzlin/Heimer>  
DAS-UI <https://das-ui.firebaseio.com/> && <https://szymonkaliski.com/writing/2017-09-08-building-das-ui/>  
Enso (diagrammatic coding) - <https://enso.org/language>  
Orca (procedural sequencers) - <https://github.com/Hundredrabbits/Orca>  
Taichi (spatially sparse multi-level data structures) - <https://github.com/taichi-dev/taichi>  
Rasdaman (datacube and arrays) - <http://www.rasdaman.org/wiki>

Categorical Data (data-related tasks using category theory) - <https://www.categoricaldata.net/>  
Egison (efficient non-linear pattern matching with backtracking for non-free data type) - <https://www.egison.org/>  
Eve (uniform data-processing) - <http://witheve.com/>  
Fluidinfo (columnar shareable data) - <https://github.com/fluidinfo> && <https://en.wikipedia.org/wiki/Fluidinfo>  
MentDB (world wide Data) - [https://www.mentdb.org/mentdb\\_weak.html](https://www.mentdb.org/mentdb_weak.html)

#### STRUCTS\* WITH META

Bedrock (meta-distro) <https://bedrocklinux.org/>  
Funtoo (meta-distro) - <https://www.funtoo.org/Welcome>  
T2 System Development Environment (meta-distro) - <https://t2sde.org/index.cgi/>  
DL Linux (meta-meta-distro) - <https://web.archive.org/web/20181221164035/https://www.sudosatirical.com/articles/dl-linux-0-0-1-released/>  
Black (reflective) - <http://pllab.is.ocha.ac.jp/~asai/Black/>  
Terra (meta-programming) - <http://terralang.org/>  
MetaL (meta-language) - <https://www.meta-language.net/faq.html#what>  
Rinci (metadata specifications) - <https://metacpan.org/pod/Rinci#ABSTRACT>  
Circle (meta-programming) - <https://www.circle-lang.org/>  
Hackett (meta-programming) - <https://lexi-lambda.github.io/hackett/>  
Elena (polymorphic code) - <https://github.com/ELENA-LANG/elena-lang/wiki/ELENA-Programming-Manual#overview>  
Beluga (mechanizing meta-theory) - <https://www.cs.mcgill.ca/~complogic/beluga/index.html>  
Hazel (incomplete programs) - <https://hazel.org/>  
Autohotkey (gui and scripting automation for windows) - <https://www.autohotkey.com/>  
Rosie Pattern (beyond regex) - <https://rosie-lang.org/about/>  
Antipurity (self-aware interpreter) - <https://github.com/Antipurity/conceptual>  
Multicompiler (defensive compiler) - <https://immunant.com/blog/2018/09/multicompiler/>  
Avail (articulate programming) - <https://www.availang.org/about-avail/introduction/index.html>  
Push (evolutionary computing) - <https://faculty.hampshire.edu/lspector/push.html>  
Wyvern (built-in skill for large-scale design) - <https://wyvernlang.github.io/>  
Gen (probabilistic) - <https://probcomp.github.io/Gen/>  
Pyro (probabilistic) - <https://pyro.ai/>  
Rascal (meta-programming) - <https://www.rascal-mpl.org/>  
Pharo (software as objects, immersive) - <https://pharo.org/features>

#### SOUND\*

Gwion - <https://gwion.github.io/Gwion/>  
Kronos vesaronilo - <http://kronos.vesanorilo.com/>  
Supercollider - <https://supercollider.github.io/>  
Faust - <https://faust.grame.fr/>  
Chuck - <http://chuck.cs.princeton.edu/>

#### NETWORKING\*

Live Raizo (network simulation) - <https://sourceforge.net/projects/live-raizo/>  
P4 (implement specific network behaviours) - <https://p4.org/>  
Helena (browsing automation) - <https://helena-lang.org/>  
Volunia (rpg-like browser) <http://www.volunia.com/>  
Gather (rpg-like meetings) - <https://www.gather.town/>  
Lynx (textual browser) - [https://en.wikipedia.org/wiki/Lynx\\_\(web\\_browser\)](https://en.wikipedia.org/wiki/Lynx_(web_browser))  
Beaker Browser (peer-to-peer Web browser) - <https://beakerbrowser.com/>  
Nyx browser (keyboard-driven browser) - <https://github.com/atlas-engineer/next>  
Jolie (microservices) - <https://www.jolie-lang.org/>  
Daphile (headless music server) - <https://www.daphile.com/>  
Skywave linux (software defined radio servers) - <https://skywavelinux.com/>  
Gotenna (off-grid mobile mesh) - <https://gotenna.com/>  
Manyverse (off-grid social networking) - <https://www.manyverse.se/faq/what-is-manyverse>  
p2p networking - <https://www.gnunet.org/en/> <https://zeronet.io/> <https://freenetproject.org/>  
Eternal-september private news server (usenet) - <http://eternal-september.org/>  
Aioe.org public news server (usenet) - <https://news.aioe.org/>  
Fediverse (federated servers for web-publishing) - <https://en.wikipedia.org/wiki/Fediverse>

#### OPERATING SYSTEM\*

XOD.IO (microcontrollers) - <https://xod.io/>  
Elemental Processor SIMulator - <https://wepsim.github.io/>  
Mikrocodesimulator MikroSim 2010 (microcode) - [http://www.mikrocodesimulator.de/index\\_eng.php](http://www.mikrocodesimulator.de/index_eng.php)  
Katai Struct (binary data structures) - <https://kaitai.io/>  
Snowdrop OS (16-Bit Operating System) - <http://sebastianmihai.com/snowdrop/>  
Turbo Rascal (design of 8-bit/16-bit games) - <https://lemonspawn.com/turbo-rascal-syntax-error-expected-but-begin/>

Tunguska (a ternary computer emulator) - Viktor Lofgren - <http://tunguska.sourceforge.net/>  
The Trillium Architecture - Douglas W. Jones - <http://homepage.divms.uiowa.edu/~jones/ternary/trillium.shtml>  
Red (full-stack) - <https://www.red-lang.org/p/about.html>  
Racket - <https://racket-lang.org/> && Neverlang - <https://cazzola.di.unimi.it/neverlang2.html> (language creation)  
Rescatux - <https://www.supergrubdisk.org/rescatux/> && Parted Magic - <https://partedmagic.com/> (OSes for rescue and recovery)  
Minix - <https://www.minix3.org/> && 'An Open Letter to Intel' - <https://www.cs.vu.nl/~ast/intel/>  
Los Procesadores Intel tienen un Secreto Misterio - <https://www.youtube.com/watch?v=CaLb7waR6eo>  
Debian-hurd (debian over Hurd) - <https://www.debian.org/ports/hurd/> [https://en.wikipedia.org/wiki/GNU\\_Hurd](https://en.wikipedia.org/wiki/GNU_Hurd)  
Trisquel (ubuntu over Libre-Linux) - <https://trisquel.info/>  
Ratpoison (Window Manager) - <https://www.nongnu.org/ratpoison/>  
IceWM (Window Manager) - <https://ice-wm.org/>  
RedoxOS - <https://doc.redox-os.org/book/ch01-06-how-redox-compares.html>  
Linux From Scratch! - <https://www.linuxfromscratch.org/>

#### LANGUAGE\*

Sono (linguistic study) - <https://github.com/Nallantli/Sono>  
Quorum (evidence-oriented) - <https://quorumlanguage.com/reference.html>  
Inform7 (interactive narrative, textual adventures) - <http://inform7.com/>  
Poliqarp (universal concordancer for large corpora) - <http://poliqarp.sourceforge.net/about.html>  
Paper generator - [https://en.wikipedia.org/wiki/Paper\\_generator](https://en.wikipedia.org/wiki/Paper_generator)

#### GRAPHICS\*

Curv (mathematical methods for art design)- <https://github.com/curv3d/curv>  
GraRLS (static graphic images) - <http://www.grarls.org/>  
KUIML (skin and GUI) - <https://www.bluecataudio.com/Vault/Skins/KUIML/>  
Complexities of Color in Computing - Ellen Wondra - <https://www.youtube.com/watch?v=VCvOwoeOgv8>  
Dr Huang's Math Handbook Calculator - <http://drhuang.com/> && <http://drhuang.com/science/mathematics/software/>  
Draw2D (diagrams) - <http://www.draw2d.org/draw2d/examples.html>  
Threejs (creation of 3D content) - <https://threejs.org/manual/#en/fundamentals>  
Video (video editing) - <https://lang.video/>

### (7) CYBERNETICS

The Cybernetic Foundation of Mathematics ( Semantic graphs and Labeling rules at pages 118 - 121 )  
[https://pat.keldysh.ru/~roman/doc/Turchin/1983\\_Turchin\\_The\\_Cybernetic\\_Foundation\\_of\\_Mathematics.pdf](https://pat.keldysh.ru/~roman/doc/Turchin/1983_Turchin_The_Cybernetic_Foundation_of_Mathematics.pdf)  
Valentin Turchin - <https://pat.keldysh.ru/~roman/doc/Turchin/>

Diagnosing the System for Organizations - Stafford Beer  
<https://www.amazon.com/Diagnosing-System-Organizations-Stafford-Beer/dp/0471951366>  
Beyond Dispute: The Invention of Team Syntegrity  
<https://www.amazon.com/Beyond-Dispute-Invention-Team-Syntegrity/dp/0471944513>  
Viable system model - [https://en.wikipedia.org/wiki/Viable\\_system\\_model](https://en.wikipedia.org/wiki/Viable_system_model)  
How Many Grapes Went Into the Wine - Stafford Beer (see chapter 'The Irrelevance of Automation')  
<https://www.amazon.com/Many-Grapes-Went-into-Wine/dp/0471942960>

Cybersyn - <http://www.cybersyn.cl/> && <http://wiki.p2pfoundation.net/Cybersyn>  
'Chile Secreto Capítulo 3 : Proyecto Cybersyn' - <https://www.youtube.com/watch?v=4cK7RRH2dX0>

Homeostat - <http://pespmc1.vub.ac.be/ASC/HOMEOSTAT.html> &&  
Variety (cybernetics) - [https://en.wikipedia.org/wiki/Variety\\_\(cybernetics\)](https://en.wikipedia.org/wiki/Variety_(cybernetics))

Engineering cybernetics: 60 years in the making - Zhiqiang Gao  
[https://www.researchgate.net/publication/271917376\\_Engineering\\_cybernetics\\_60\\_years\\_in\\_the\\_making](https://www.researchgate.net/publication/271917376_Engineering_cybernetics_60_years_in_the_making)  
Engineering Cybernetics - Hsue-Shen Tsien [Qian Xuesen] - <https://babel.hathitrust.org/cgi/pt?id=uc1.b3734950&view=1up&seq=7>  
Man-Machine-Environment System Engineering Proceedings of the 17th International Conference on MMESE - S. Long and B. Dhillon

The energy evolution - <https://www.amazon.com/Energy-Evolution-Schaubergers-Eco-technology-Schauberger/dp/B00IGYQ24U>  
The Fertile Earth - <https://www.amazon.com/Fertile-Earth-Agriculture-Fertilisation-Ecotechnology/dp/B01FGORR8M>

Cypherpunk - <https://en.wikipedia.org/wiki/Cypherpunk>

Plexil (robotics and systems) - <http://plexil.sourceforge.net/wiki/index.php/Overview>  
Modelica (language for modeling of cyber-physical systems) - <https://modelica.org/modelicalanguage.html>

Resource Based Economy - [https://www.youtube.com/watch?v=\\_EkMjTnWk14](https://www.youtube.com/watch?v=_EkMjTnWk14) && <https://www.resourcebasedeconomy.org/>



Center for Resource Management - <https://www.thevenusproject.com/center-for-resource-management/>  
Self Erecting Structures - <https://www.youtube.com/watch?v=CM8bNZTvX3A>  
Comparison with current technologies - <https://www.youtube.com/watch?v=T9c821s9mjw>  
RBE TVP research center mix - <https://www.youtube.com/watch?v=Jy967Y0OsWY>

Destiny and Control in Human Systems Studies in the Interactive Connectedness of Time - Charles Muses  
<https://www.amazon.co.uk/Destiny-control-human-systems-chronotopology/dp/157898727X>  
SUPL (Syntactic Universal Programming Language): a new dimension in software design and artificial intelligence  
How to make a stupid machine clever by cybernetically opportunistic programming  
Cybernetics today and tomorrow: The place of hypernumbers

## **(8) NUMERALS ON CONSCIOUSNESS**

Cognitive-Theoretic Model of the Universe (CTMU) - Christopher Langan - <http://hology.org/>  
Chris Langan on IQ, The Singularity, Free Will, Psychedelics, CTMU, and God - <https://www.youtube.com/watch?v=N-bRM1kYuNA>  
CTMU Wiki - <https://ctmucommunity.org/wiki/> && CTMU Papers <http://hology.org/ctmu-papers/>  
Interview of Langan by Michael Knowles - <https://www.youtube.com/watch?v=11-ckSz6FrQ>  
Chris Langan A Kastrup on Consciousness, Metaphysics, Computation, and God - <https://www.youtube.com/watch?v=HsXxgQy4xLQ>

International Journal of Mathematics and Consciousness - <http://www.ijmac.com/papers>  
Consciousness Is All There Is: A Mathematical Approach with Applications - Tony Nader  
<http://www.ijmac.com/wp-content/uploads/2015/12/all05.pdf>

Glasgow\_Coma\_Scale - [https://en.wikipedia.org/wiki/Glasgow\\_Coma\\_Scale#Scoring](https://en.wikipedia.org/wiki/Glasgow_Coma_Scale#Scoring)  
Levels of consciousness - [https://en.wikipedia.org/wiki/Altered\\_level\\_of\\_consciousness#Definition](https://en.wikipedia.org/wiki/Altered_level_of_consciousness#Definition)

Strange loop - [https://en.wikipedia.org/wiki/Strange\\_loop](https://en.wikipedia.org/wiki/Strange_loop)  
I Am a Strange Loop - Douglas R. Hofstadter - <https://www.amazon.com/Am-Strange-Loop-Douglas-Hofstadter-ebook/dp/B004PYDBS0>

Psychedelic Information Theory: Shamanism in the Age of Reason - James L. Kent  
<https://www.amazon.com/Psychedelic-Information-Theory-Shamanism-Reason/dp/1453760172>  
Geometry of Trips - <https://psychonautwiki.org/wiki/Geometry>  
Polynomial Root-finding and Polynomiography - Bhaman Kalantari (see section 'Polynomiography based on Voronoi coloring')  
<https://www.amazon.com/Polynomial-Root-finding-Polynomiography-Bahman-Kalantari/dp/9812700595>  
Pascalejandro – Alejandro Jodorowsky and Pascal Montandon - <http://pascalemontandon.com/albums-work/pascalejandro/>

## **(9) BEYOND COMPLEX NUMBERS AND THE PLANE**

Dual Quaternion - [https://en.wikipedia.org/wiki/Dual\\_quaternion](https://en.wikipedia.org/wiki/Dual_quaternion)

Truly hypocomplex numbers : Unification of numbers and vectors - Redouane Bouhennache - <https://arxiv.org/pdf/1409.2757.pdf>

On a novel 3D hypercomplex number system - Shlomo Jacobi - <https://arxiv.org/pdf/1509.01459.pdf>

Generalizaciones de los números: de la aritmética a las variedades diferenciables - Fernando Etayo Gordejuela  
<https://repositorio.unican.es/xmlui/bitstream/handle/10902/13817/2016GacRSocMatEspGeneralization.pdf?sequence=1&isAllowed=y>

Ensemble de nombres - Taladris, Silk78, Seirios, Telchar, Tigerfou and Médiat - <https://forums.futura-sciences.com/mathematiques/>

NOMBRES : CURIOSITÉS, THÉORIE, USAGE - Gérard Villemin - <http://villemin.gerard.free.fr/>

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